FOX PIT

2004 Fish Management Report

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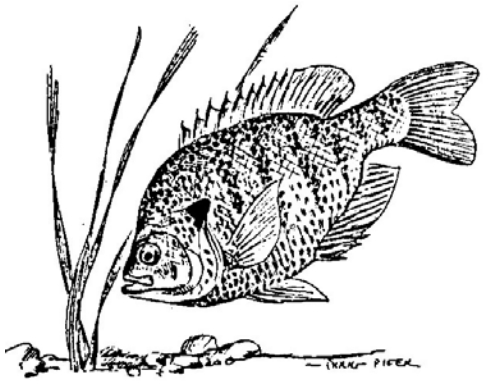

FISHERIES SECTION
INDIANA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISH AND WILDLIFE
402 W. Washington Street
Indianapolis, Indiana 46204

2005

FOX PIT
Pike County

Fish Management Report
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INTRODUCTION

Fox Pit is a 4.8-acre strip pit located in Pike County, on Area 6 of Sugar Ridge Fish and Wildlife Area (SRFWA). Area 6 is located ½ mile west of Stendal, Indiana. This is the largest contiguous unit of SRFWA, comprising 2,609 acres. Shoreline fishing is limited at Fox Pit, and boat access is provided by a gravel boat ramp.

Past fish management activities include general fisheries surveys in 1971, 1974, and 1994. A triploid grass carp study project was conducted from 1985 through 1990 and a smallmouth bass and yellow perch stocking evaluation occurred in 1991. The grass carp project included pre and post fish renovations at Fox Pit. This project helped lead to the establishment of Indiana grass carp stocking guidelines. The 1991 stocking evaluation showed the smallmouth bass stocking was a success. However, it was determined that the largemouth bass still present would out-compete the smallmouth bass and likely cause them to disappear. The yellow perch stocking was not successful.

In 1994, the smallmouth bass population had begun to decrease and the bluegill population was dominated by small, slow growing fish. The largemouth bass population was found to be a major contributor to the fishery.

The current survey was conducted on June 6 and 7, 2004 to monitor largemouth bass and bluegill growth and abundance. In addition, an aquatic vegetation survey was conducted on July 26.

Temperature and dissolved oxygen profiles, turbidity, alkalinity, conductivity, and pH data were collected as per standard lake survey procedures. The aquatic vegetation survey was conducted as described by Pearson 2004. Fish collection effort consisted of two gill net lifts, one trap net lift, and 0.50 hour of pulsed D.C. night electrofishing. Two individuals collected fish stunned by the electrofishing boat. The electrofishing boat booms and electrode dropper arrangement were modified to more effectively stun fish in the highly conductive water. One boom with three electrode droppers made from ¼ inch stainless steel rigging cable was used as the anode. The other boom was used as the cathode with the standard arrangement of droppers.

RESULTS

Water chemistry data were standard for a strip pit. Oxygen was sufficient for fish survival to a depth of 10 feet. Turbidity was low as indicated by a secchi disk reading of 6 feet during the fish management and vegetation survey.

The vegetation survey consisted of 25 sites of which 20 contained some amount of vegetation. Vegetation was found to a depth of 11 feet. Abundance was low as indicated by a mean rake score of 0.68 (max = 5.00). Eight submersed aquatic species were collected. Variable watermilfoil was the most abundant species followed by Eurasian watermilfoil, coontail, and eastern bladderwort.

A total of 222 fish representing four species was collected that weighed 27.13 pounds. Bluegill were most abundant by number followed by redear sunfish, largemouth bass, and green sunfish.

One-hundred-and-forty-eight bluegill were collected that weighed 10.84 pounds. They ranged in length from 1.2 to 7.7 inches. Relative abundance was 67% by number and 40% by weight. The bluegill electrofishing catch rate was 172.0 per hour, a decrease of 55% from the 1994 catch rate of 382.0 per hour. The trap net catch rate was 62.0 per lift and no bluegill were collected in gill nets. Bluegill growth was below the district average for ages 1 through 3 and average for ages 4 and 5. Growth for age 3 and 4 fish is 1.2 and 1.4 inches longer than in 1994.

The bluegill proportional stock density (PSD) was 27, which is a big increase from the 1994 PSD of 1. The suggested range of bluegill PSD indicating a healthy balanced fishery is 20 to 60 (Anderson and Neumann 1996). The bluegill relative stock density-7 (RSD7) was 10 and RSD8 was 0. In 1994, the RSD7 and RSD8 were both 0.

The bluegill fishing potential (BGFP) index classified the lake as having “fair” bluegill fishing with an index score of 15 out of a possible score of 40 (Ball and Tousignant 1996). In 1994 the BGFP index classified the lake as having “poor” bluegill fishing (score of 4). Three out of the four categories (growth, PSD, and RSD8) scored a 0 in 1994. An increase in growth and PSD has improved the BGFP index.

Thirty-eight redear sunfish were collected that weighed 7.07 pounds. They ranged in length from 3.4 to 9.5 inches. Relative abundance was 17% by number and 26% by weight. The electrofishing and trap net catch rates were 28.0 per hour and 24.0 per lift. No redear were collected in gill nets. Redear growth was below district averages for ages 1 through 3 and average for age 4.

A total of 35 largemouth bass was collected that weighed 9.01 pounds. They ranged in length from 1.6 to 12.9 inches. Relative abundance was 16% by number and 33% by weight. The electrofishing catch rate was 68.0 per hour. In 1994 the electrofishing catch rate was 104.0 per hour. No largemouth bass were collected in trap nets and the gill net catch rate was 0.5 per lift. Largemouth bass growth for all ages was at the low end of the district average. Growth for age 2 and 3 bass has slightly increased when compared to 1994.

The largemouth bass PSD index value in 2004 changed very little since 1994, going from 11 to 13. The suggested largemouth bass PSD range indicating a healthy balanced

fishery is 40 to 70 (Anderson and Neumann 1996). The largemouth bass RSD14 has decreased from 5 in 1994 to 0. Only one bass greater than 14 inches was collected in 1994.

CONCLUSIONS AND RECOMMENDATIONS

Fox Pit provides good fishing for bluegill, redear sunfish, and catch-and-release fishing for largemouth bass. Bluegill were collected up to 7.7 inches and redear up to 9.5 inches in length.

The poor bluegill fishery present in 1994 has developed into a balanced population. This is supported by decreased relative abundance, improved growth, and improved length frequency. Bluegill relative abundance by number has decreased by 7% since 1994. Growth has increased for age 3 and 4 bluegill. Growth for all ages should increase as a result of fewer individuals in the population. The bluegill PSD has increased considerably since 1994 and is now within the recommended range for a balanced population. The major factor in the improvement of the bluegill population is the rebound of the largemouth bass population.

The collection of 38 redear sunfish was a surprise. In all previous fisheries work at Fox Pit dating back to 1971, only one individual has been collected (Blackwell 1990). Their presence will add to the anglers creel. There are two possible ways that redear became introduced into Fox Pit. Nearby Prairie Pond has had an established redear sunfish population for many years and during extreme high water periods, it is possible that Prairie Pond and Fox Pit connect allowing for fish passage. The alternative explanation is the illegal stocking by anglers.

The largemouth bass population has changed very little since 1994. Catch rates for bass were low but comparable to other highly conductive waters. Largemouth bass relative abundance and growth indicate a stable population at this time. Largemouth bass will continue to provide good catch and release fishing at Fox Pit.

Smallmouth bass were not found in the present survey. Fox Pit experienced a rapid reduction in water level of approximately 4 feet when the Division of Reclamation removed a beaver dam at the outlet of the lake. This water level reduction combined with competition with largemouth bass likely resulted in the elimination of smallmouth bass at Fox Pit.

LITERATURE CITED

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Submitted by: Jason C. Doll, Assistant Fisheries Biologist
Date: February 1, 2005

Approved by: Daniel P. Carnahan, Fisheries Biologist

Approved by: _____
Brian M. Schoenung, Fisheries Supervisor
Date: April 15, 2005

LAKE SURVEY REPORT

Type of Survey: [ ] Initial Survey [X] Re-Survey

Lake Name	County	Date of survey (Month, day, year)
Fox Pit	Pike	July 6-7, 2004
Biologist's name		Date of approval (Month, day, year)
Jason C. Doll		April 15, 2005

LOCATION

Quadrangle Name	Range	Section
Augusta	7W	3
Township Name	Nearest Town	
3S	Stendal	

ACCESSIBILITY

State owned public access site	Privately owned public access site	Other access site
Gravel boat ramp		

Surface acres	Maximum depth	Average depth	Acre feet	Water level	Extreme fluctuations
4.8	19.0	10.0	48.0		

Location of benchmark

INLETS

Name	Location	Origin
Unnamed tributary	NW Cove	Runoff
Unnamed tributary	NE Cove	Runoff

OUTLETS

Name	Location
Unnamed	South end

Water level control: None

POOL	ELEVATION (Feet MSL)	ACRES
TOP OF DAM		
TOP OF FLOOD CONTROL POOL		
TOP OF CONSERVATION POOL		
TOP OF MINIMUM POOL		
STREAMBED		

Bottom type

	Bolder
	Gravel
	Sand
X	Muck
X	Clay
	Marl

Watershed use: Spoil bank on Sugar Ridge Fish and Wildlife Area

Development of shoreline: None

Previous surveys and investigations: Fish management survey's in 1971, 1974, and 1994

Grass carp study 1985 - 1990

Smallmouth bass and yellow perch stocking evaluation in 1991

SAMPLING EFFORT					
ELECTROFISHING	Day hours		Night hours 0.5		Total hours 0.5
TRAP NETS	Number of traps 1		Number of Lifts 1		Total effort 1 lift
GILL NETS	Number of nets 2		Number of Lifts 1		Total effort 2 lifts
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

PHYSICAL AND CHEMICAL CHARACTERISTICS	
Color: Light green	Turbidity: 6 Feet 0 Inches (SECCHI DISK)
Alkalinity (ppm)*: Surface: 153.9 Bottom: 205.2	pH: Surface: 7.9 Bottom: 7.2
Conductivity: 789 microsiemens	Air temperature: 73.8 °F
Water chemistry GPS coordinates: N 38.3548	W -87.2307

TEMPERATURE AND DISSOLVED OXYGEN (D.O.)								
DEPTH (FEET)	Degrees (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)
SURFACE	79.3	9.8	36			72		
2	79.3	9.8	38			74		
4	79.3	9.8	40			76		
6	77.0	9.4	42			78		
8	71.6	9.0	44			80		
10	66.2	3.2	46			82		
12	59.9	1.4	48			84		
14	57.4	1.2	50			86		
16	46.1	0.8	52			88		
18			54			90		
20			56			92		
22			58			94		
24			60			96		
26			62			98		
28			64			100		
30			66					
32			68					
34			70					

COMMENTS

*ppm-parts per million

Occurrence and Abundance of Submersed Aquatic Plants

Date:	7/26/04	Littoral sites with plants:	20	Species diversity:	0.84
Littoral depth (ft):	11.0	Number of species:	8	Native diversity:	0.80
Littoral sites:	23	Maximum species/site:	6	Rake diversity:	0.83
Total sites:	25	Mean number species/site:	2.09	Native rake diversity:	0.80
Secchi:	6.0	Mean native species/site:	1.65	*Mean rake score:	0.68

Common Name	Site frequency	Relative density	Mean density	Dominance
Brittle naiad	13.0	0.13	1.00	2.6
Chara	13.0	0.17	1.33	3.5
Coontail	39.1	0.39	1.00	7.8
Eastern bladderwort	30.4	0.30	1.00	6.1
Eurasian watermilfoil	39.1	0.43	1.11	8.7
Leafy pondweed	13.0	0.17	1.33	3.5
Spikerush	8.7	0.09	1.00	1.7
Variable watermilfoil	47.8	0.61	1.27	12.2
Filamentous algae	17.4			
Other Observed Plants				
Swamp loosestrife, creeping water primrose, and duckweed				

*Mean rake score includes filamentous algae

SPECIES AND RELATIVE ABUNDANCE OF FISHES COLLECTED BY NUMBER AND WEIGHT					
*COMMON NAME OF FISH	NUMBER	PERCENT	LENGTH RANGE (inches)	WEIGHT (pounds)	PERCENT
Bluegill	148	66.7	1.2 - 7.7	10.84	40.0
Redear sunfish	38	17.1	3.4 - 9.5	7.07	26.1
Largemouth bass	35	15.8	1.6 - 12.9	9.01	33.2
Green sunfish	1	0.5	6.6	0.21	0.8
Totals	222			27.13	

*Common names of fishes recognized by the American Fisheries Society.

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF BLUEGILL									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0	1	0.7	0.01	0	19.0				
1.5	1	0.7	0.01	1	19.5				
2.0	9	6.1	0.01	1	20.0				
2.5	17	11.5	0.01	1,2	20.5				
3.0	20	13.5	0.02	2	21.0				
3.5	36	24.3	0.03	2	21.5				
4.0	9	6.1	0.04	2,3	22.0				
4.5	8	5.4	0.06	2,3	22.5				
5.0	6	4.1	0.08	3	23.0				
5.5	9	6.1	0.11	3	23.5				
6.0	13	8.8	0.15	3	24.0				
6.5	6	4.1	0.20	3,4	24.5				
7.0	9	6.1	0.26	4,5	25.0				
7.5	4	2.7	0.32	5,6	25.5				
8.0					26.0				
8.5					TOTAL	148			
9.0									
9.5									
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	172.0 /hr	GILL NET CATCH	0.0 /lift	TRAP NET CATCH	62.0 /lift

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF REDEAR SUNFISH									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5	1	2.6	0.03	1	21.5				
4.0	1	2.6	0.04	1	22.0				
4.5	4	10.5	0.06	2	22.5				
5.0	6	15.8	0.08	2	23.0				
5.5	4	10.5	0.11	2	23.5				
6.0	3	7.9	0.15	2	24.0				
6.5	6	15.8	0.20	3	24.5				
7.0	5	13.2	0.23	3	25.0				
7.5	4	10.5	0.31	3,4	25.5				
8.0	2	5.3	0.37	4	26.0				
8.5	1	2.6	0.44	5	TOTAL	38			
9.0									
9.5	1	2.6	0.62	6					
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	28.0 /hr	GILL NET CATCH	0.0 /lift	TRAP NET CATCH	24.0 /lift

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF LARGEMOUTH BASS									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5	2	5.7	0.01	0	19.5				
2.0	2	5.7	0.01	0	20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0				
4.5					22.5				
5.0					23.0				
5.5	4	11.4	0.07	1	23.5				
6.0	8	22.9	0.09	1	24.0				
6.5	3	8.6	0.12	1	24.5				
7.0	1	2.9	0.15	2	25.0				
7.5					25.5				
8.0	1	2.9	0.23	2	26.0				
8.5	1	2.9	0.26	2	TOTAL	35			
9.0	2	5.7	0.31	3					
9.5	2	5.7	0.36	3					
10.0	3	8.6	0.43	3					
10.5									
11.0	1	2.9	0.58	3					
11.5	3	8.6	0.68	3,4					
12.0	1	2.9	0.75	4					
12.5									
13.0	1	2.9	0.97	4					
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	68.0 /hr	GILL NET CATCH	0.5 /lift	TRAP NET CATCH	0.0 /lift

Species Bluegill	YEAR CLASS	NUMBER OF FISH AGED	SIZE RANGE	BACK CALCULATED LENGTH (inches) AT EACH AGE							
				I	II	III	IV	V	VI	VII	VIII
Intercept= 0.8	2003	10	1.6 - 2.7	1.4							
	2002	15	2.5 - 4.4	1.4	2.4						
	2001	21	4.1 - 6.3	1.4	2.6	4.5					
	2000	6	6.4 - 6.9	1.3	2.4	4.0	6.1				
	1999	7	7.0 - 7.6	1.3	2.2	4.6	5.8	6.8			
	1998*	1	7.7	1.2	1.9	3.6	5.8	7.0	7.5		
	AVERAGE LENGTH			1.3	2.4	4.3	5.9	6.8			
	NUMBER AGED			59	49	34	13	7			

Species Redear sunfish	YEAR CLASS	NUMBER OF FISH AGED	SIZE RANGE	BACK CALCULATED LENGTH (inches) AT EACH AGE							
				I	II	III	IV	V	VI	VII	VIII
Intercept= 0.6	2003*	2	3.4 - 4.2	2.0							
	2002	15	4.5 - 6.0	1.7	3.6						
	2001	12	6.4 - 7.3	1.3	3.1	5.4					
	2000	5	7.3 - 7.9	1.4	3.0	5.9	7.2				
	1999*	1	8.4	1.6	3.5	5.2	7.7	8.1			
	1998*	1	9.5	1.7	2.8	4.9	8.2	9.0	9.3		
	AVERAGE LENGTH			1.4	3.2	5.7	7.2				
	NUMBER AGED			32	32	17	5				

Species Largemouth bass	YEAR CLASS	NUMBER OF FISH AGED	SIZE RANGE	BACK CALCULATED LENGTH (inches) AT EACH AGE							
				I	II	III	IV	V	VI	VII	VIII
Intercept= 0.8	2003	15	5.4 - 6.6	3.4							
	2002	3	7.2 - 8.3	3.1	6.6						
	2001	9	8.9 - 11.3	3.3	6.5	9.0					
	2000	4	11.4 - 12.9	3.5	7.3	10.1	11.3				
	AVERAGE LENGTH			3.3	6.8	9.6	11.3				
	NUMBER AGED			31	16	13	4				

*Not included in average length calculations.

GPS LOCATION OF SAMPLING EQUIPMENT

GILL NETS		
1	N 38.2850	W -87.1748
2	N 38.2858	W -87.1755
3	N	W
4	N	W
5	N	W
6	N	W
7	N	W
8	N	W
9	N	W
10	N	W
11	N	W
12	N	W
13	N	W
14	N	W
15	N	W
16	N	W
17	N	W
18	N	W
19	N	W
20	N	W

TRAP NETS		
1	N 38.2870	W -87.1753
2	N	W
3	N	W
4	N	W
5	N	W
6	N	W
7	N	W
8	N	W
9	N	W
10	N	W
11	N	W
12	N	W
13	N	W
14	N	W
15	N	W
16	N	W
17	N	W
18	N	W
19	N	W
20	N	W

ELECTROFISHING		
1	N 38.2843	W -87.1775
	N 38.2843	W -87.1775
2	N 38.2843	W -87.1775
	N 38.2852	W -87.1760
3	N	W
	N	W
4	N	W
	N	W
5	N	W
	N	W
6	N	W
	N	W
7	N	W
	N	W
8	N	W
	N	W
9	N	W
	N	W
10	N	W
	N	W
11	N	W
	N	W
12	N	W
	N	W
13	N	W
	N	W
14	N	W
	N	W
15	N	W
	N	W
16	N	W
	N	W
17	N	W
	N	W
18	N	W
	N	W
19	N	W
	N	W
20	N	W
	N	W